

## **Field evaluation and selection for competitiveness against weeds**

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This paper considers the evaluation of new varieties in relation to key plant characteristics, and how important they are in weed suppression for different climatic regions. These include early growth habit, speed of early development, tillering ability and late growth habit. Weed suppression cannot be attributed to a single characteristic either within or between varieties. Instead the interaction between a series of desirable characteristics has been shown to be important, with varieties compensating for weakness in certain characteristics with strengths in others. The importance of assessing crop ground cover in testing systems is discussed.

The balance between different characteristics for weed suppression will determine the value of the variety for early, late and season-long weed control, and for the climatic zone. For example, in very dry zones, highly erectophile habits may be preferred for later moisture conservation. However, in cool, moist climates, season-long weed suppression may be required and early prostrate and later planophile habit with large leaves, and high tillering ability (because of greater establishment risks) are more important.

Selection for general growth habits is based on understanding the role of different characteristics in weed competition. These will be of value under different circumstances or locations in organic farming. Defined growth habits are: (1) The continuous planophile habit which has a clear advantage for weed suppression over the erectophile type at a given plant or shoot population density. (2) The early season erectophile to late season planophile habit is a good model when crop establishment is high and sown in narrow rows, but is risky when crop establishment is poor or early weed growth high. (3) The early planophile to late erectophile habit can compensate more for lower crop establishment than the early erectophiles. This is of most benefit where early weed growth dominates. (4) A continuous erectophile habit is only beneficial when weed levels are low, but is a poor strategy when weed establishment is moderate to high, especially early in the growing season.

The paper presents results from the EU funded project on 'Strategies for Weed Control in Organic Farming (WECOF)' which examined plant and crop characteristics for weed suppression in winter wheat, so as to determine their relative importance. Selection for weed suppression will be of advantage for organic farmers, and farmers practicing integrated methods of agriculture. The paper also considers how competition against weeds could be selected for as specific traits or by the integration of several desirable characteristics under specified testing conditions.